

General Description

The EST2500 series is an excellent primary side feedback controller to drive an external power bipolar junction transistor (BJT). It can meet the Energy-Star[®] specification for AC/DC single output power supplies with no-load power consumption less than 100mW. It minimizes the components counts and is available in a tiny SOT-26 package. Those make it an ideal design for low cost applications.

It provides constant voltage, constant current and cable compensation, Also, the EST2500 series is built-in the VCC over-voltage protection and FB pins to prevent the circuit being damaged from the abnormal conditions.

Features

- Primary-Side Control, No Opto-Coupler Needed
- Very low startup current (<6uA)
- Directly drive BJT
- Constant-Voltage(CV) and constant-current (CC)
- LEB (Leading-edge blanking) on CS Pin
- Non-audible-noise Green mode control
- VCC OVP-voltage Protection
- Output OVP-voltage Protection
- Cable Compensation for CV regulation
- Over Temperature Protection
- SOT-23-6 package
- RoHS compliant and Halogen free

Application

- Low power AC/DC offline SMPS for
- Cell phone charger
- Replacement for Linear adapter
- Lower power adapter
- Tablet PC

Ordering Information

Order Number	Package Type	Packing	Top Marking	Note
EST2500A	SOT-23-6	Tape & Reel	25AX	Green Package
EST2500H	SOT-23-6	Tape & Reel	25HX	Green Package

Application Circuit

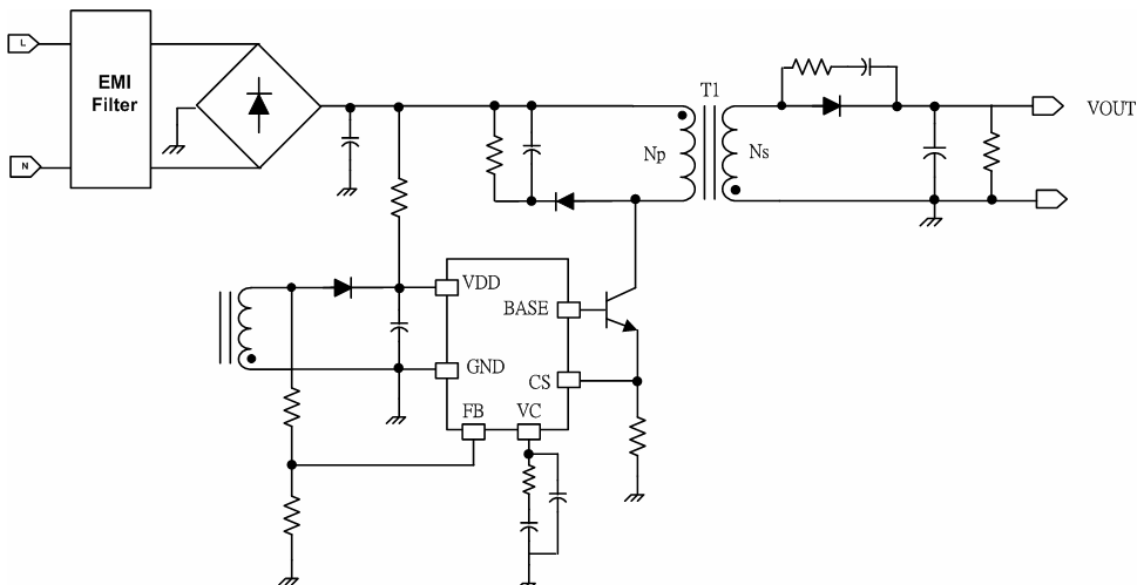
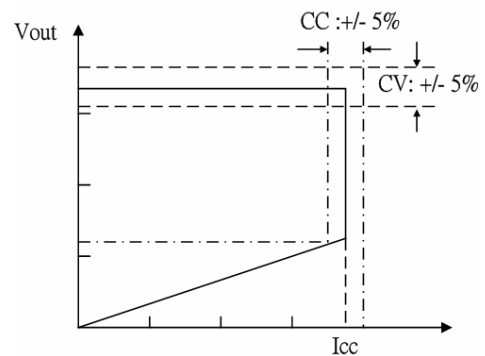


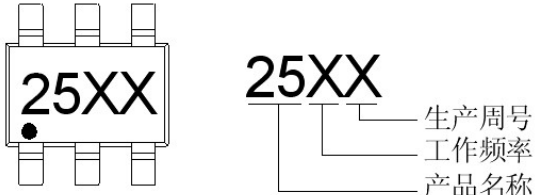
Fig 1. Typical CC/CV Curve



Pin Assignments and Package Type

Pin Number	Pin Name	Function
1	GND	Ground
2	CS	Current sense pin.
3	BASE	Driver output to driver the external BJT
4	FB	Sense the transformer winding voltage waveform.
5	VC	Output of the error amplifier for voltage loop compensation.
6	VDD	Power supply pin

Pin connection and Marking (Top View)

Part Number	Freq.	
25AX	A=65 KHz	
25HX	H=100 KHz	

SOT-23-6L

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		Min.	Max	
VDD Voltage	VDD	-0.3	30	V
VC Voltage	VC,	-0.3	7	
FB Voltage	FB	-0.3	7	V
CS Voltage	CS	-0.3	7	
BASE Voltage	BASE	-0.3	7	V
Junction Temperature	T _j	-40	150	°C
Operation Ambient Temperature	T _{opr}	-20	85	°C
Storage Temperature	T _{stg}	-65	150	°C
Package Thermal Resistance (SOT-23-6)	θ _{JA}	-	250	°C/W
Power Dissipation @TA=85°C (SOT-23-6)	P _D	-	0.25	W
Lead temperature (Soldering, 10 sec)		-	260	°C
ESD(Human Body Mode)	V _{ESD-HBM}	-	3.0	KV
ESD(Machine Model)	V _{ESD-MM}	-	300	V

Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability

Block Diagram

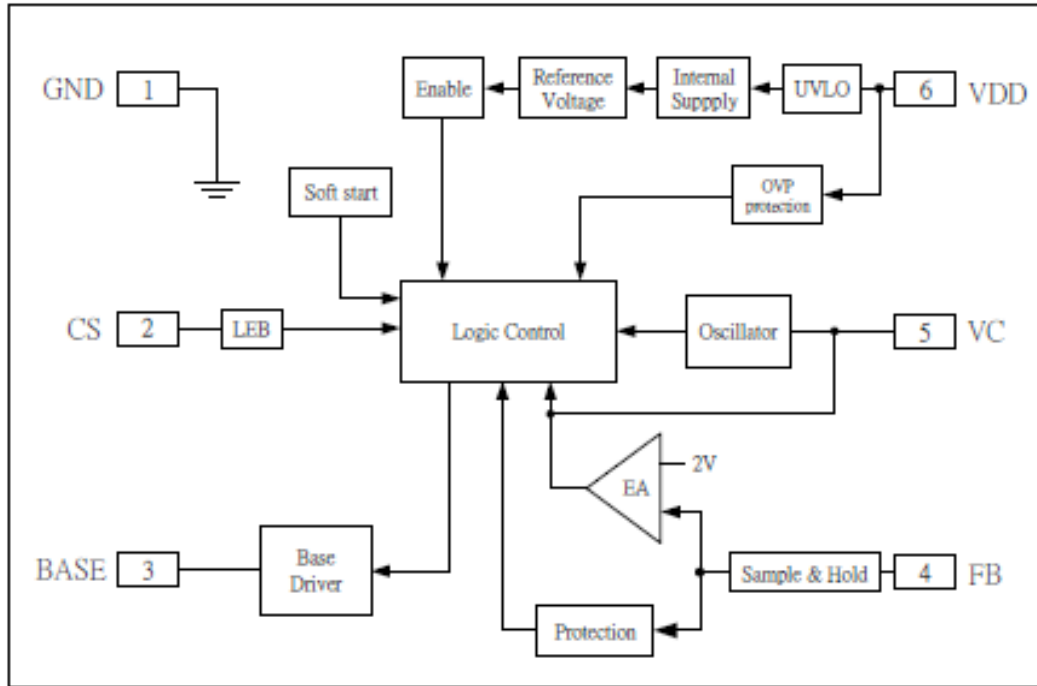


Fig. 3

Recommended Operating Conditions

Parameter	Svmbol	Min.	Max	Unit
Supply Voltage VDD	V_{CC}	7	20	V
Startup Resistor Value	R_{star}	0.6	4	M Ω
Junction temperature range	T_j	-40	150	$^{\circ}C$
Ambient temperature range	T_{opr}	-40	85	$^{\circ}C$

DC Electrical Characteristics (VDD = 15V, TA = 25°C, unless otherwise specified.)

VDD SECTION

Parameter	Svmbol	Test Conditions	Min	Tvp	Max	Units
Continuously operating voltage	V_{OP}				25	V
Start-up current	$I_{Start-up}$	VDD = 9.5V	2	6	10	μA
On threshold voltage	V_{CC-ON}		10.0	11.0	12.0	V
Off threshold voltage	V_{CC-OFF}		5.0	5.5	6.0	V
Operating supply current	I_{CC-OP}	VDD = 15V, $F_S = F_{OSC}$	0.8	1.5	2.0	mA
VCC over voltage protection level	V_{OVP}		25	27	29.5	V

EST2500A/H

Green-Mode PWM Flyback (PSR) Controller



CURRENT-SENSE SECTION

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Leading edge blanking	T_{LEB}			500		ns
Over current threshold	V_{CS-TH}		1.0	1.1	1.2	V

FB SECTION

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Feedback input voltage	V_{ref_fb}		1.97	2	2.03	v
Blanking time				2		uS

OUT SECTION

Parameter	Symbol	Test Conditions	Min	Tvp	Max	Units
Maximum frequency for A version	F_{OSC}		62	65	68	KHz
Maximum frequency for H version	F_{OSC}		96	100	104	KHz
Maximum duty cycle	D_{MAX}		65	70	75	%
Jitter range	F_J		±2	±3	±4	%
Soft start	T_{SS}		3	4	5	mS
Over temperature protection	T_{OTP}			150		°C
OTP Hysteresis	T_{OTP_HYS}			20		°C

Typical Performance Characteristics

Fig. 4 UVLO (ON) V.S TEMP

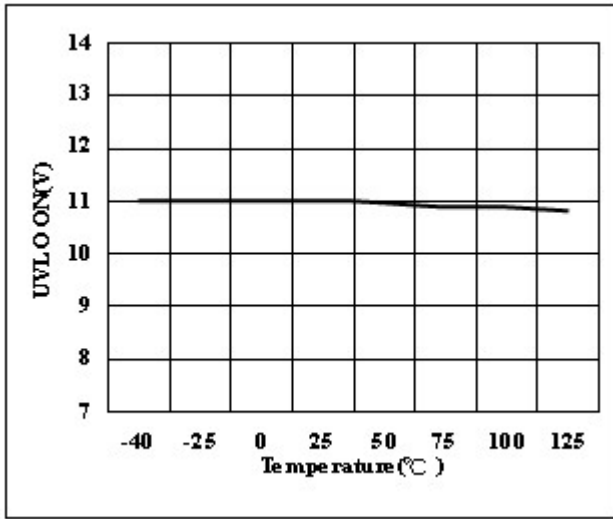


Fig. 5 UVLO (OFF) V.S TEMP

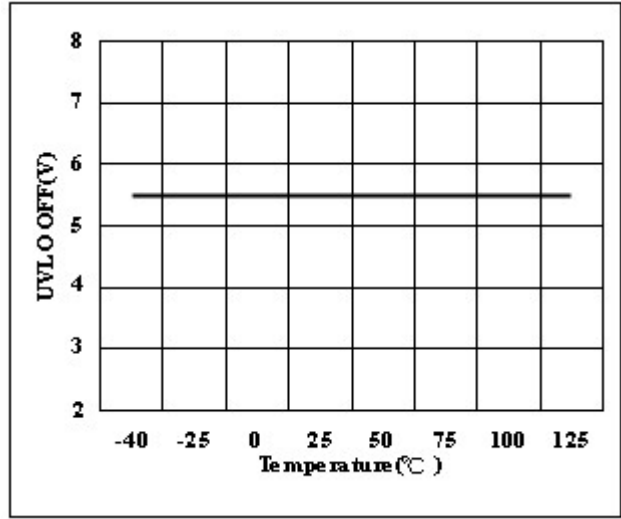


Fig. 6 ISTARTUP VS TEMP

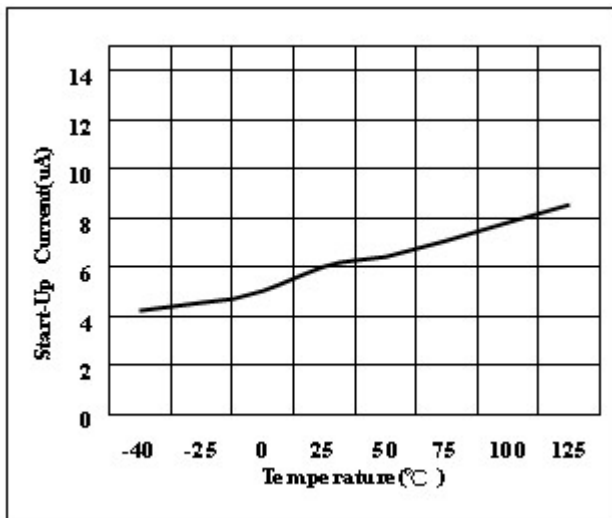
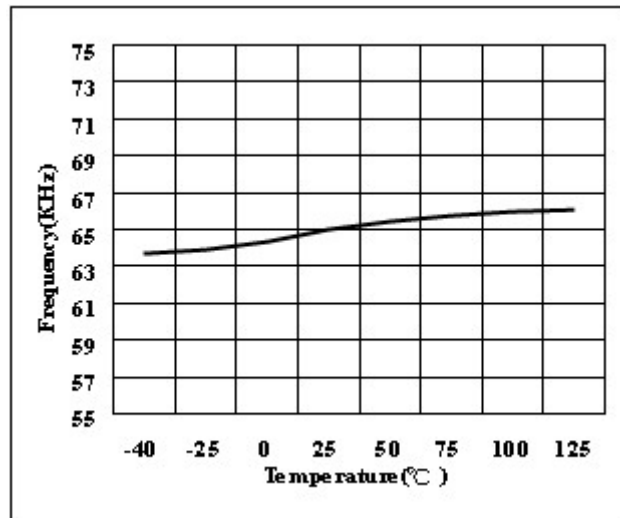


Fig. 7 FREQUENCY VS TEMP



Package Information

SOT-23-6L:

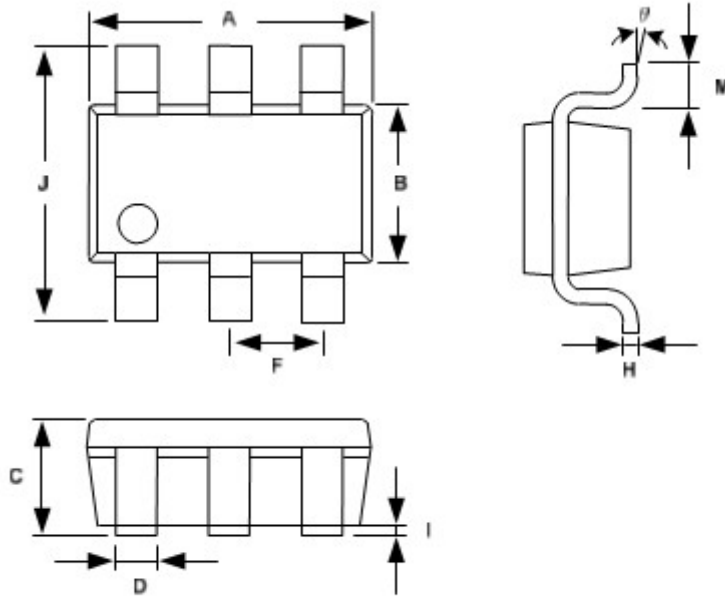
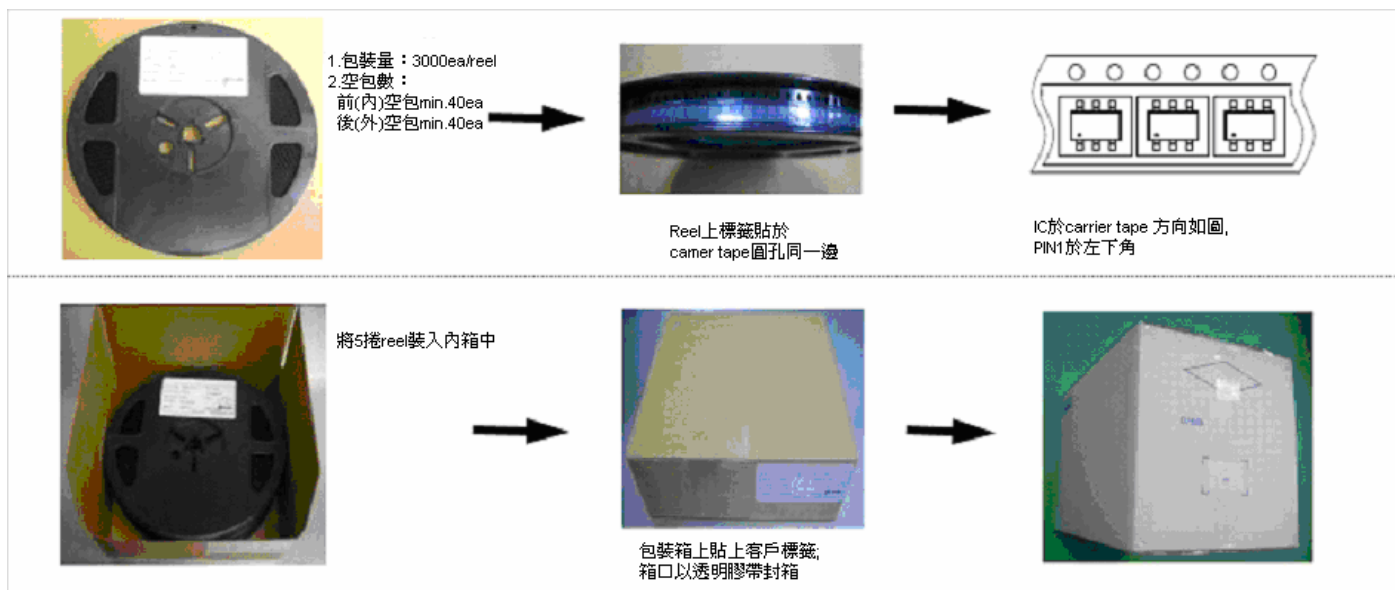


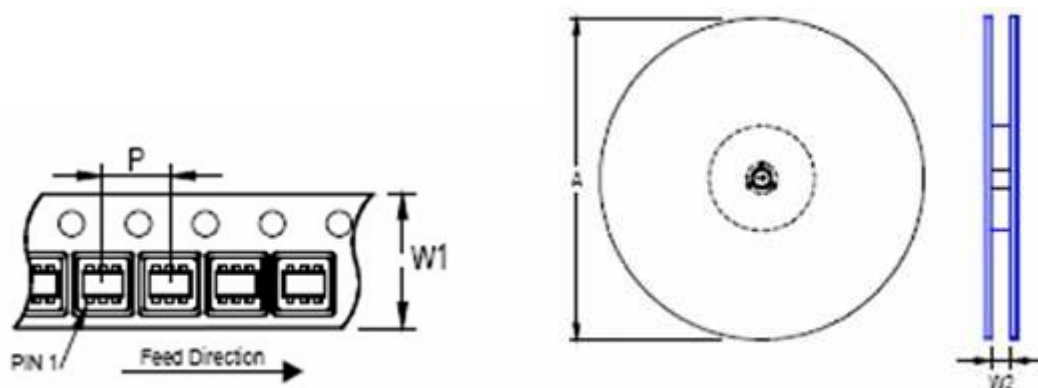
Fig 8

Symbol	Dimension in mm		Dimension in inch	
	MIN.	MAX.	MIN.	MAX.
A	2.692	3.099	0.106	0.122
B	1.397	1.803	0.055	0.071
C	-----	1.450	-----	0.057
D	0.300	0.550	0.012	0.022
F	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
I	0.050	0.150	0.002	0.006
J	2.600	3.000	0.102	0.118
M	0.300	0.600	0.012	0.024
θ	0°	10°	0°	10°

Shipping packing



Tape Reel Data



Package Type SOT-26	Tape Size (W1) (mm)	Pocket Pitch (P) (mm)	Reel Size (A) (mm)	Reel Width (W2) Min./Max. (mm)	Units Per Reel pcs.
6 Lead	8	4	180	8.4/9.9	3000

EST2500A/H

Green-Mode PWM Flyback (PSR) Controller



Update History

Revision	Date	Update
1.00	August 06, 2012	Preliminary version